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From: CN=Jayne Carlin/OU=R10/O=USEPA/C=US
Sent: Fri 11/30/2012 2:05:01 AM
Subject: channel complexity and temperature
http://www.epa.gov/region10/pdf/water/torgersen_etal_2012_cold_water_refuges.pdf

----- Forwarded by Jayne Carlin/R10/USEPA/US on 11/29/2012 04:26 PM -----

From: David Powers/R10/USEPA/US
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Cc: foster.eugene@deq.state.or.us, David Croxton/R10/USEPA/US@EPA
Date: 09/11/2012 02:55 PM
Subject: Fw: channel complexity and temperature

Josh and Ryan are familiar with the EPA cold water refugia report ([http link below](http://www.epa.gov/region10/pdf/water/torgersen_etal_2012_cold_water_refuges.pdf)). The report included excellent references on cold water refugia which would be valuable for the Mid-coast TMDL temperature TWG and LSAC .

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http://www.epa.gov/region10/pdf/water/torgersen_etal_2012_cold_water_refuges.pdf

Some potentially useful papers:

Johnson, S. L. 2004. Factors influencing stream temperatures in small streams: substrate effects and a shading experiment. *Canadian Journal of Fisheries and Aquatic Sciences* 61:913-923.

Wondzell, S. M. 2006. Effect of morphology and discharge on hyporheic exchange flows in two small streams in the Cascade Mountains of Oregon, USA. *Hydrological Processes* 20:267-287.

Hester, E. T., M. W. Doyle, and G. C. Poole. 2009. The influence of in-stream structures on summer water temperatures via induced hyporheic exchange. *Limnology and Oceanography* 51:355-367.

Hester, E. T., and M. N. Gooseff. 2010. Moving beyond the banks: Hyporheic restoration is fundamental to restoring ecological services and functions of streams. *Environmental Science & Technology* 44:1521-1525.

Hester, E. T., and M. N. Gooseff. 2011. Hyporheic restoration in streams and rivers. Pages 167-187 in A. Simon, S. J. Bennett, and J. M. Castro, editors. *Stream restoration in dynamic fluvial systems: Scientific approaches, analyses, and tools*. American Geophysical Union, Washington, D.C.

Ebersole, J. L., W. J. Liss, and C. A. Frissell. 2003b. Thermal heterogeneity, stream channel morphology, and salmonid abundance in northeastern Oregon streams. *Canadian Journal of Fisheries and Aquatic Sciences* 60:1266-1280.

Poole, G. C., and C. H. Berman. 2001. An ecological perspective on in-stream temperature: Natural heat dynamics and mechanisms of human-caused thermal degradation. *Environmental Management* 27:787-

802.

Also, you Bob Danehy with NCASI, who has been doing work on Mosby Creek in the Cascades and testing the hypothesis of stream channel complexity effects on temperature. "Danehy, Bob" <bdanehy@NCASI.org>

[attachment "Hester and Doyle 2011.pdf" deleted by Jayne Carlin/R10/USEPA/US] [attachment "Hester and Gooseff 10.pdf" deleted by Jayne Carlin/R10/USEPA/US] [attachment "PooleandBerman2001.pdf" deleted by Jayne Carlin/R10/USEPA/US] [attachment "Ebersole et al 2003 thermal het and salmon.pdf" deleted by Jayne Carlin/R10/USEPA/US] [attachment "johnson_sl_2003streamtemp.pdf" deleted by Jayne Carlin/R10/USEPA/US] [attachment "Wondzell hyporheic 11.pdf" deleted by Jayne Carlin/R10/USEPA/US]